The Viability of Tree Leaves for Cellulosic Ethanol: Testing Glucose Levels in Select Quercus & Acer saccharum Species

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Have you ever wondered if there will be a new biofuel that will help solve the current gas crisis? Biofuels are made from a biomass or plant material. In this project, green leaves and leaf litter from two sugar maple varieties and two oak tree varieties are being tested as a viable replacement for corn and soybeans in ethanol production. The purpose behind this project is to determine which of the leaves of two species of sugar maple and two species of oak hold more glucose that would make them a viable source for cellulosic ethanol. It was hypothesized that the sugar maple leaves would contain more glucose than the oak leaves. There are two methods that can be used to determine the glucose level in plants. A popular method used is acid hydrolysis followed by enzyme hydrolysis. Another not so common method is enzyme hydrolysis alone. Both methods were tested. Enzyme hydrolysis alone was most effective for leaves, shorting the time and expense to process the leaves for ethanol. The results of the experiment showed that leaves from the white oak variety contained the most glucose in green leaves and the leaf litter. The hypothesis that maple leaves would contain more glucose than the oak was rejected. But the hypothesis that tree leaves in general could contain enough cellulosic glucose to be considered an alternative source for ethanol was accepted.

Awards Won: